What is claimed is:

1. In a communication apparatus, an improvement of tunable filter tunable to each selected center wavelength of a number of channels, and each of the channels centered on a corresponding gridline of a selected wavelength grid; said tunable filter comprising:

a grid generator suitable for positioning in an optical path of a beam, and the grid generator of a first selected optical path length determinative of a first free spectral range substantially corresponding to a spacing between adjacent gridlines of the selected wavelength grid; and

a channel selector suitable for positioning in the optical path of the beam and the channel selector with a tunable second optical path length determinative of a second free spectral range differing from the first free spectral range by an amount corresponding substantially inversely with the number of channels of the selected wavelength grid and said second optical path length tunable to a selected one of the number of channels of the wavelength grid.

2. The tunable filter of Claim 1, wherein the second free spectral range of said channel selector differs from the first free spectral range by an amount substantially corresponding with the quotient of the first free spectral range and the number of channels of the selected wavelength grid.

3. The tunable filter of Claim 1, wherein a finesse of said channel selector substantially corresponds with less than the number of channels of the selected wavelength grid.

4. The tunable filter of Claim 1, wherein said grid generator further comprises at least one of a Fabry-Perot filter and an interference element.

5. The tunable filter of Claim 1, wherein said grid generator further comprises an etalon.

6. The tunable filter of Claim 1, wherein said grid generator further comprises:

an Etalon; and

a thermal controller to control a temperature of said Etalon to maintain the first selected optical path length.

7. The tunable filter of Claim 1, wherein said channel selector further comprises at least one of: a diffraction element, an interference element, and a birefringent element.

8. The tunable filter of Claim 7, wherein the channel selector further comprises:

a mechanical actuator to tune said channel selector by varying the tunable second optical path length of said channel selector.

9. The tunable filter of Claim 7, wherein the channel selector further comprises:

a thermal actuator to tune said channel selector by varying the tunable second optical path length of said channel selector.

10. The tunable filter of Claim 7, wherein the channel selector further comprises:

a electro-optic actuator to tune said channel selector by varying the tunable second optical path length of said channel selector.

11. The tunable filter of Claim 1, wherein the channel selector includes at least one of selected length and a tunable index of refraction.

12. The tunable filter of Claim 1, wherein the channel selector includes a tunable length and a selected index of refraction.

13. The tunable filter of Claim 1, wherein said channel selector comprises:

an gas spaced etalon tunable by means of tuning a pressure of a gas within the gap to vary the second optical path length.

14. The tunable filter of Claim 1, wherein said channel selector comprises:

an etalon electrically tunable in response to an applied electric field to vary the second optical pathlength.

15. The tunable filter of Claim 1, wherein the channel selector further comprises:

an etalon thermally tunable in response to an applied thermal energy to vary the second optical path length.

16. The tunable filter of Claim 1, wherein said channel selector further comprises:

a semiconductor element with a tunable index of refraction responsive to the applied electric field to vary the second optical path length.

17. The tunable filter of Claim 7, wherein the birefringent element includes at least one of: a Pockels cell and a Kerr cell.

18. The tunable filter of Claim 7, wherein the interference element comprises:

a wedge-shaped etalon.

19. The tunable filter of Claim 18, wherein the interference element comprises at least one of a wedge-shaped solid etalon and a wedge-shaped air gap etalon.

20. The tunable filter of Claim 18, wherein the wedge-shaped etalon further comprises:

an actuator for translating said wedge-shaped etalon across the optical path of the beam to tune the second optical path length.

21. The tunable filter of Claim 1, wherein said channel selector further comprises:

a grating; and

an actuator for varying an angle of said grating with respect to an optical path of the beam to tune the beam to a selected one of the plurality of channels of the wavelength grid.

22. The tunable filter of Claim 1, further comprising:

a logic to tune said channel selector to the selected one of the number of channels of the wavelength grid.

23. The tunable filter of Claim 1, further comprising:

a logic to tune said grid generator to the selected wavelength grid.

24. In the communication apparatus of Claim 1, a further improvement of:

a gain medium to emit a beam, and said gain medium capable of accepting feedback to tune a selected wavelength at which to lase; and

said tunable filter positioned in an optical path of the beam to provide the feedback to tune the gain medium to a selected one of the number of channels of the wavelength grid.

25. The communication apparatus of Claim 1, a further improvement comprising:

a first optical circulator with at least a first port, a second port and a third port and a beam entering the first port exiting the second port, and the beam entering the second port exiting the third port;

a second optical circulator with at least the first port, the second port and the third port and the beam entering the first port exiting the second port, and the beam entering the second port exiting the third port; and

said tunable filter optically coupled to the second port of said first optical circulator and the first port of said second optical circulator to tune to a selected one of the number of channels of the wavelength grid to pass between the second port of said first optical circulator and the first port of said second optical circulator.

26. The communication apparatus of Claim 1, a further improvement comprising:

a gain medium tunable to emit a beam at a selected wavelength;

said tunable filter with an input an output, and said tunable filter input positioned in an optical path of the beam to provide at said output a filter of said beam at a selected one of the number of channels of the wavelength grid;

an error detector to detect a difference in energy levels of said beam at said input and said output of said tunable filter; and

logic for providing a closed loop feedback of the difference to tune said gain medium to the selected one of the number of channels.

27. The communication apparatus of Claim 1, and said grid generator comprising:

a gain medium to emit a beam, and the gain medium including a front facet and a rear facet and the first selected optical path length between the front facet and the rear facet determinative of the first free spectral range and substantially corresponding to the spacing between adjacent gridlines of the selected wavelength grid.

28. The communication apparatus of Claim 1, and said channel selector comprising:

a gain medium to emit a beam and the gain medium including a front facet and a rear facet and the tunable second selected optical path length between the front facet and the rear facet determinative of the second free spectral range differing from the first free spectral range by an amount corresponding substantially inversely with the number of channels of the selected wavelength grid, and said second optical path length tunable to a selected one of the number of channels of the wavelength grid.

29. A method for filtering an optical beam to a corresponding center wavelength for each of a number of channels of a selected wavelength grid, and the method for tuning comprising the acts of:

filtering the optical beam to select a first set of wavelengths with a first free spectral range substantially corresponding with the center wavelengths for each of the number of channels;

tuning the optical beam to a selected one of a second set of wavelengths with a second free spectral range differing from the first free spectral range by an amount corresponding substantially inversely with the number of channels of the selected wavelength grid.

30. The method of Claim 29, wherein the tuning act further comprises the act of:

aligning the selected one of the second set of wavelengths with the selected one of the first set of wavelengths to tune the optical beam to the selected one of the number of channels.

31. The method of Claim 29, wherein the filtering act further comprises the act of:

generating a first interference within the optical beam with a periodicity substantially corresponding to the center wavelengths of each of the plurality of channels.

32. The method of claim 29, wherein the tuning act further comprises the acts of:

generating a second interference within the optical beam with a tunable second free spectral range differing from the first free spectral range by an

amount substantially corresponding to the quotient of a spacing of the first free spectral range and the number of channels of the selected wavelength grid; and

varying the second interference within the optical beam to tune the optical beam to a selected one of the number of channels of the wavelength grid.

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